FORM PTO-1390 (REV. 1-98) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: OML.31

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 09/622159

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/GB99/00473	15 February 1999	14 February 1998

TITLE OF INVENTION: MEDICAL INJECTION DEVICES

APPLICANT(S) FOR DO/EO/US: Jeremy MARSHALL and Glenn DAVISON

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:

    Search Report

534 Rec'd PCT/PTO 14 AUG 2000

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/622159	PCT/GB99/00473	OML.31

17. [X] The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... $ 970.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $840.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $690.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $670.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840	
Surcharge of $130.00 for furnishing the oath or declaration later than [ ] 20 [X] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	8 - 20 =	0	x $18.00	$ 0	
Independent claims	1 - 3 =	0	x $78.00	$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $260.00	$	

TOTAL OF ABOVE CALCULATIONS =	$ 970	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28). +	$	
SUBTOTAL =	$ 970	
Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).	$	
TOTAL NATIONAL FEE =	$ 970	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +	$	
TOTAL FEES ENCLOSED =	$ 970	
Amount to be refunded:	$	
charged:	$	

a. [X] A check in the amount of $ 970 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required by 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No. 25-0120. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

August 14, 2000

SEND ALL CORRESPONDENCE TO:

Young & Thompson
745 South 23rd Street
2nd Floor
Arlington, VA 22202
(703) 521-2297

Customer No. 000466

Benoit Castel
SIGNATURE

Benoit Castel
NAME

35,041
REGISTRATION NUMBER

Form B

VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c))--SMALL BUSINESS CONCERN

Docket Number (Optional)
OML.31

Applicant or Patentee: Jeremy MARSHALL and Glenn DAVISON
Serial or Patent No.: 09/662,159
Filed or Issued: August 14, 2000
Title: MEDICAL INJECTION DEVICES

I hereby declare that I am

☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN OWEN MUMFORD LIMITED
ADDRESS OF SMALL BUSINESS CONCERN Brook Hill, Woodstock
Oxford OX20 1TU, Great Britain

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

☐ the specification filed herewith with title as listed above.
☒ the application identified above.
☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate verified statements averring to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization having any rights in the invention is listed below:

☒ no such person, concern, or organization exists.
☐ each such person, concern or organization is listed below.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING David Danvers CROSSMAN
TITLE OF PERSON IF OTHER THAN OWNER Managing Director
ADDRESS OF PERSON SIGNING Brook Hill, Woodstock, Oxford OX20 1TU, Great Britain
SIGNATURE _____ DATE 1st September 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Jeremy MARSHALL et al.

Serial No. (unknown)

Filed herewith

MEDICAL INJECTION DEVICES

PRELIMINARY AMENDMENT

Commissioner of Patents

Washington, D.C. 20231

Sir:

Prior to calculation of the filing fee, please amend the above-identified application as follows:

IN THE CLAIMS:

Claim 4, line 1, cancel "or 3".

Claim 7, line 1, change "any preceding claim" to --claim 1--.

Respectfully submitted,

YOUNG & THOMPSON

By _____

Benoît Castel
Attorney for Applicants
Registration No. 35,041
745 South 23rd Street
Arlington, VA 22202
Telephone: 703/521-2297

August 14, 2000

Improvements Relating to Medical Injection Devices

This invention relates to medical injection devices. It is particularly concerned with the automatic firing of an injector having a barrel-like body with a sliding trigger on one side to eject the dose from a needle at its forward end. The action of the trigger is forwards against a stiff spring. Preferably, there is a dose setting mechanism such as a rotary knob at its rear end which may be "clicked" round to a desired setting. All the trigger does is to release a spring which shoots a plunger forwards by an amount determined by the knob, this plunger co-operating with a piston in a capsule carrying the dose.

Such injectors are well known, but they require the user to insert the needle into the flesh first, before releasing the trigger. For self-users, this can be particularly difficult: it is natural to flinch and not push the needle in far enough.

The aim of this invention is to provide a device that can automate this operation, ensuring that the injector needle is thrust in to the correct degree before the dose is ejected.

According to the present invention there is provided a a firing device for an injector having a barrel-like body with a sliding trigger on one side to eject the dose from a needle at its forward end, the action of the trigger being forwards against a resistance, the device comprising a generally cylindrical housing for the injector, a forward

portion of the housing, open at its forward end for projection of the injector needle, containing spring means for exerting a light rearward force on the injector, and a rearward portion of the housing having an axially movable, forward spring-loaded member to cooperate with the injector trigger, an external cocking mechanism operable to energise the spring loading of said member, and an operating element to release that loading to cause the member first, acting through the injector trigger, to shoot the injector forward against the light rearward force of said spring means to a needle projecting position, and then to overcome said resistance operate the trigger to eject the dose from the injector.

The spring-loaded member may be generally tubular to embrace the injector, a coil spring acting between its rear end and an internal abutment at the rear end of the barrel.

Conveniently, an axial slot, open from the forward end of the tubular member, receives the trigger and thereby locates the injector rotationally. The trigger will be engaged by the closed rear end of this slot.

The cocking mechanism is preferably a sleeve over the rearward portion of the housing with at least one lateral projection from the tubular member projecting through an axially parallel slot in the housing into an axially parallel slot in the sleeve, the cocking action being to pull the sleeve rearwardly so that the projection engaged by the forward end of its slot takes the tubular member with it until there is snap engagement between the tubular member

and the barrel, the injector being pushed back at the same time by the spring means.

This arrangement also ensure that there is no mutual rotation between the tubular member, the housing and the sleeve.

Conveniently, the sleeve carries the operating element which can only register in a position to release the snap engagement when the sleeve is moved forwards again after the device has been cocked. The operating element is preferably a button which engages in a slot in the housing and which has two different positions between which it can be shifted circumferentially of the sleeve only when that is forwards. In one said position it acts by co-operation with a step in the slot as a preventer against the sleeve being slid rearwardly, that position also being the one, when the sleeve is moved forwards after cocking, in which the device can be fired. In the other said position, it allows the external sleeve to be slid rearwardly (and forwardly again), but is ineffective, when pressed, to fire the device.

When the device is for an injector having a rear end rotary adjusting knob to set the amount of dose to be ejected, the sleeve, in its forward position with the device cocked, conveniently leaves this knob exposed whereby, before firing, the user can rotate the knob to the required dosage. Marks on the knob may register with a mark on the end of the sleeve to assist gauging the amount of dosage set.

For a better understanding of the invention one embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of a firing device for an injector with a firing button in a locked and firing position,

Figure 2 is a similar side view but with the firing button in a cocked position,

Figure 3 is an axial section of the device, charged with an injector, in an idle position,

Figure 4 is a similar axial section with the device just cocked,

Figure 5 is a similar axial section with the device cocked and ready to fire,

Figure 6 is a perspective view of a locator tube forming part of the device,

Figure 7 is a perspective view of a barrel into which the locator tube fits, and

Figure 8 is a perspective view of a sleeve into which the barrel fits.

The injector 1 to be fired is of known type and will not be described in detail. But its salient features for the purposes of this specification are a needle 2 at its forward end, a rotatable knob 3 at its rear end which is "clicked" round to set the desired dosage, and an elongate trigger 4 on the side of the barrel-like body towards the rear end whose firing action is forwards against a stiff spring or some other resistance. The body of the injector

narrows at a sloping shoulder 5 towards a forward end portion which has opposed windows 6 through which the capsule containing the medium to be injected can be seen.

The firing mechanism into which this injector fits has two assemblies 7 and 8 which screw together at 9. The nose assembly 7 consists of a stepped tube 10 with a cylindrical portion 11 forward of a shoulder 12 provided with opposed windows 13 which will register with the windows 6. Internally at the shoulder 12 there is an annular rib 14 which limits the fore and aft travel of a locator ring 15. This has an outwardly projecting rib 16 at its rear end, and a spring 17 acts between that rib and the root of the rib 14 to urge the locator ring 15 rearwardly with a fairly light force. Two diametrically opposed arms 18 project forwardly from the ring 15 and hooks 19 at their ends can snap past the rib 14 on assembly. The travel of the locator ring is determined by the length of these arms 18 to the hooks 19. The locator ring 15 has guide means (not shown) to keep it from rotating while allowing axial movement, and the gaps between the arms 18 register with the windows 13.

The rear assembly 8 consists of a barrel 20, with a wide external annular rib 21 just to the rear of the screw thread joint 9, a sleeve 22 encasing the barrel 20 to the rear of the rib 21, a generally tubular locator 23 for the injector within the barrel urged forwardly by a powerful spring 24 reacting against an inturned flange 25 at the rear end of the barrel, and a trigger 26 captive to the sleeve 22. The tube 10 and barrel 20, screwed together, form a

housing.

The locator 23 (Figure 6) has a wide slot 27 extending lengthways, open at its forward end and with a blind rear end, to accommodate the injector trigger 4. Diametrically opposite this a tongue 28 is integrally formed with the tube at its forward end, the free end of the tongue being thickened to project proud of the otherwise cylindrical envelope. The barrel 20 (Figure 7) has a slot 29 and an aperture 30 with which this tongue 28 can engage. The slot 29 is L-shaped in profile, open to the rear end of the barrel and with its short leg forward and aligned axially with the aperture 30. When the tongue 28 is latched into the slot 29, engaging its forward end, it holds the locator 23 back against the compressed spring 24, and when released from that it snaps into the aperture 30 to assist termination of the forward motion of the locator 23.

The locator 23 also has two diametrically opposed fins 31 which project through longitudinal slots 32 in the barrel 20, the leading edges of these fins being radial but the rear edges having a shallow slope so that the tube is radially contracted by a wedging action as it is forced rearwardly into the barrel on assembly. The slot 27 makes this deformation possible. When the fins 31 reach the slots 32 they spring outwards making the locator 23 captive to the barrel 20. Furthermore, their tips are then proud of the barrel and the sleeve 22 (Figure 8) has longitudinal slots 33 in which those tips can engage in like manner, making the sleeve captive also. The leading ends of the slots 33 serve

as stops in a manner described below. The fins 31 also ensure that there is no mutual rotation between the locator 23, the barrel 20 and the sleeve 22.

A single fin might suffice, but two are preferred.

The trigger 26 has an exposed button 34 projecting through the slot 29, in which it is captive, and through an aperture 35 in the sleeve 22. This aperture allows the button to be shifted circumferentially between the positions shown in Figures 1 and 2 when it registers with the wide, forward end of the slot 29. The trigger is retained by a plate-like extension 36 from its base which engages under the periphery of the aperture 35 and which at its rear end has an inwardly projecting wedge-shaped stud 37. Below the front of the button there is a thickened portion 38 to co-operate with the tongue 28.

The rear ends of the barrel 20, the sleeve 22 and the locator 23 are open so that the injector 1 can be fitted as shown in Figure 3, the rear end of its trigger 4 bearing against the closed end of the slot 27 and its dose adjusting knob 3 just exposed at the rear end of the injector. The sleeve 22 will have a mark against which rotation of the knob 3 can be gauged; the mark on the injector itself being hidden inside the assembly 8. With the injector so in place, the nose assembly 7 is screwed on, the locator ring 15 engaging the sloping shoulder 5 of the injector and being forced forwardly in relation to the tube 10 against the spring 17. When assembly is complete, the forward end of the ring 15 bears against the rib 14 with the spring 17

compressed. But that spring is not nearly powerful enough to overcome the spring 24 and the locator 23 remains in the forward position with the tongue 28 in the aperture 30.

The needle 2 is left exposed projecting forward of the nose assembly 7. In practice, it will have a protective sheath while this fitting together is carried out, and it will not be removed until just before use.

In the Figures 1 and 3 position of the trigger 26 the stud 37 is captive in the slot 29, preventing the sleeve 22 from moving rearwardly. The device is in an idle or non-ready condition.

For use, the trigger 26 is pushed circumferentially to the Figure 2 position to take the stud 37 out of engagement with the step formed by the short leg of the L-shaped slot 29. This trigger movement also takes the thickened portion 38 out of axial alignment with the tongue 28. The sleeve 22 can then be pulled back and, acting through the forward ends of its slots 33 and the fins 31, this also retracts the locator 23, compressing the spring 24. When fully retracted, the tongue 28 snaps into the slot 29, latching the device in the position of Figure 4. During this operation the injector 1 is pushed back by the spring 17 acting through the locator ring 15 and the needle 2 is withdrawn into the tube 10.

The sleeve 22 is now slid forwards again to abut the rib 21, fully exposing the knob 3, which is rotated to set the required dose. The trigger 26 is pushed back circumferentially to the Figure 1 position so that the stud

37 re-enters the short leg of the slot 29 while the portion 38 comes directly over the free end of the tongue 28. In this position of Figure 5 the device is ready to fire.

The free end of nose portion 11 is held against the area of skin where the injection is to be made and the button 34 pressed. This releases the tongue 28 from the slot 29 and the spring 24 shoots the locator 23 forwards. The closed end of the slot 27 bearing on the trigger 4 carries the injector forwards as well, causing the needle 2 to penetrate the skin. The trigger 4 is not immediately activated, being held rearwardly by a spring or other resistance stiffer than the spring 17. But when the locator ring 15 meets the rib 12, the trigger 4 will be pressed forward sufficiently to trip the action of the injector. The dose is therefore ejected as the forward travel of the injector is completed, back to the Figure 3 condition. The knob 3 returns to its zero position during this ejection.

The cycle is then ready to be repeated.

CLAIMS

1. A firing device for an injector having a barrel-like body with a sliding trigger on one side to eject the dose from a needle at its forward end, the action of the trigger being forwards against a resistance, the device comprising a generally cylindrical housing for the injector, a forward portion of the housing, open at its forward end for projection of the injector needle, containing spring means for exerting a light rearward force on the injector, and a rearward portion of the housing having an axially movable, forward spring-loaded member to cooperate with the injector trigger, an external cocking mechanism operable to energise the spring loading of said member, and an operating element to release that loading to cause the member first, acting through the injector trigger, to shoot the injector forward against the light rearward force of said locator to a needle projecting position, and then to overcome said resistance and operate the trigger to eject the dose from the injector.

2. A firing device as claimed in claim 1, wherein the spring-loaded member is generally tubular to embrace the injector, a coil spring acting between its rear end and an internal abutment at the rear end of the barrel.

3. A firing device as claimed in claim 2, wherein an axial slot, open from the forward end of the tubular member, receives the trigger and thereby locates the injector rotationally.

4. A firing device as claimed in claim 2 or 3, wherein the cocking mechanism is a sleeve over the rearward portion of the housing with at least one lateral projection from the tubular member projecting through an axially parallel slot in the housing into an axially parallel slot in the sleeve, the cocking action being to pull the sleeve rearwardly so that the projection engaged by the forward end of its slot takes the tubular member with it until there is snap engagement between the tubular member and the barrel, the injector being pushed back at the same time by said spring means.

5. A firing device as claimed in claim 5, wherein the sleeve carries the operating element which can only register in a position to release the snap engagement when the sleeve is moved forwards again after the device has been cocked.

6. A firing device as claimed in claim 5, wherein the operating element is a button which engages in a slot in the housing and which has two different positions between which it can be shifted circumferentially of the sleeve only when that is forwards, wherein in one said position it acts by co-operation with a step in the slot as a preventer against the sleeve being slid rearwardly, that position also being the one, when the sleeve is moved forwards after cocking, in which the device can be fired, and wherein in the other said position, it allows the external sleeve to be slid rearwardly (and forwardly again), but is ineffective, when pressed, to fire the device.

7. A firing device as claimed in any preceding claim,

wherein the device is for an injector having a rear end rotary adjusting knob to set the amount of dose to be ejected, and wherein the sleeve, in its forward position with the device cocked, leaves this knob exposed whereby, before firing, the user can rotate the knob to the required dosage.

8. A firing device as claimed in claim 7, wherein marks on the knob register with a mark on the end of the sleeve to assist gauging the amount of dosage set.

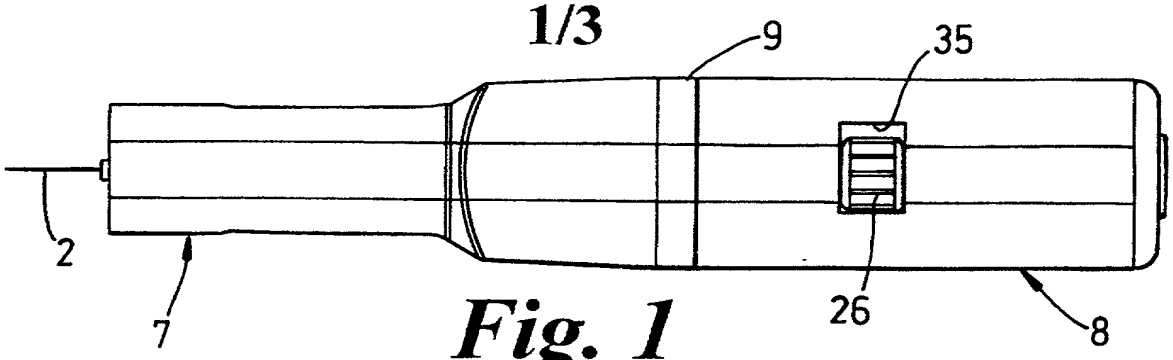

Fig. 1

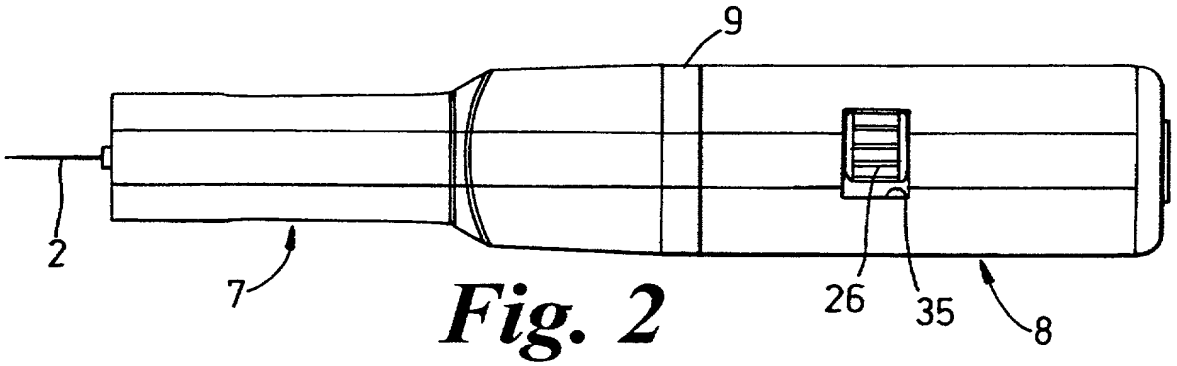

Fig. 2

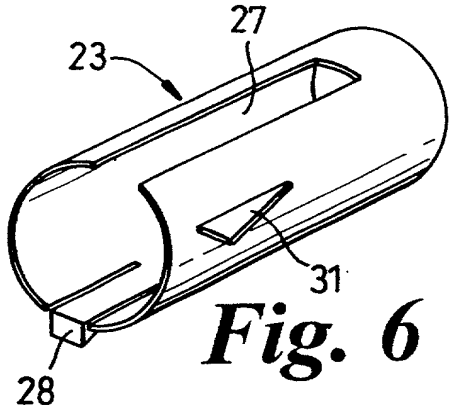

Fig. 6

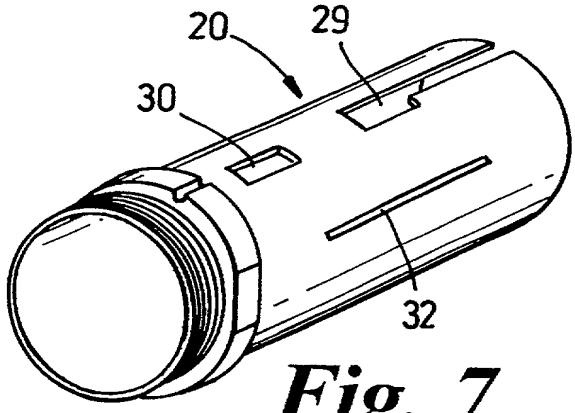

Fig. 7

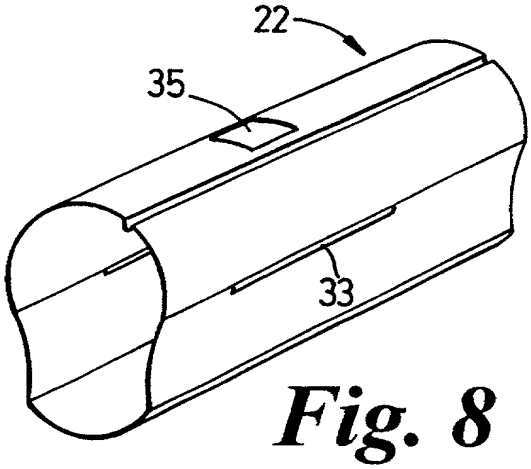

Fig. 8

2/3

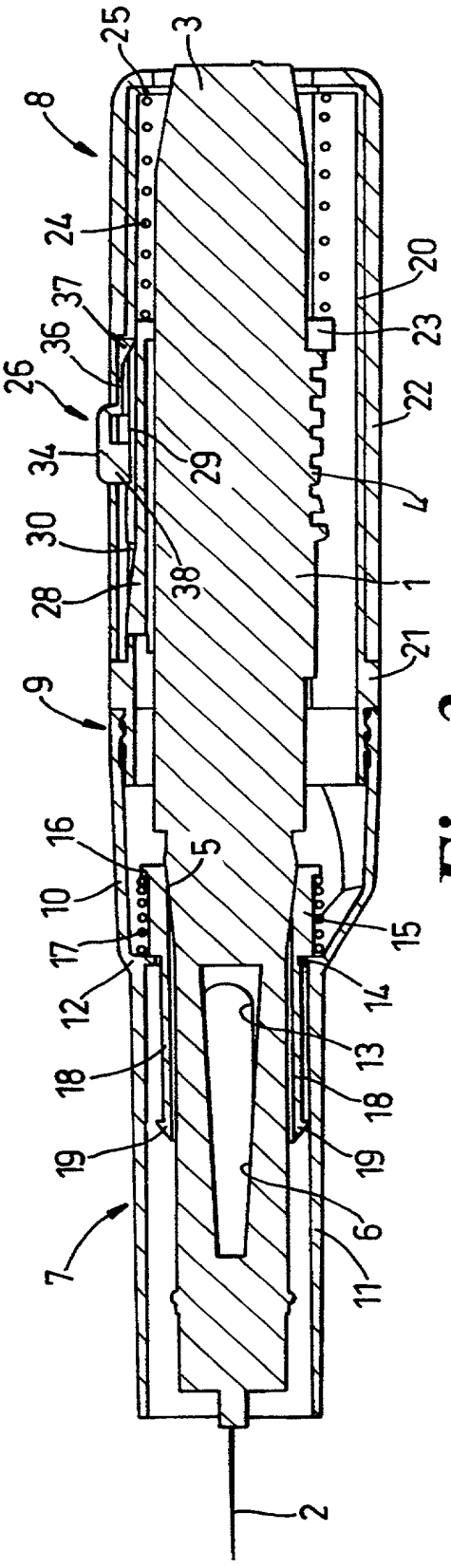
25
3
8
24
37
36
26
34
30
28
9
16
10
17
12
18
19
7
11
2
29
38
5
20
23
22
4
1
21
15
14
13
18
19
6

Fig. 3

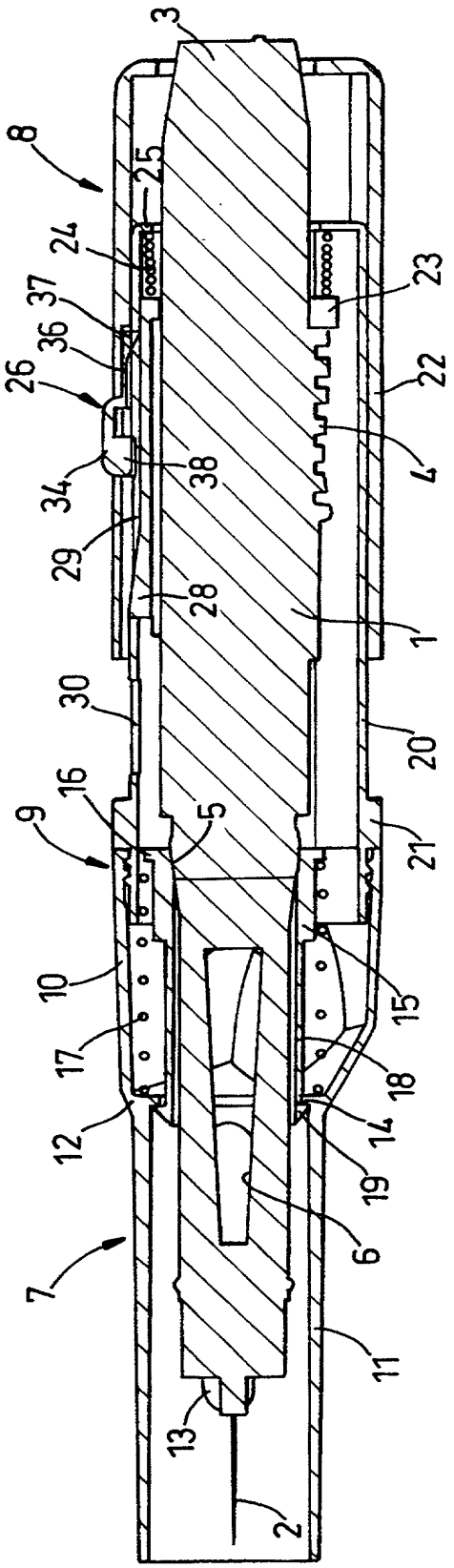
3
8
25
24
37
36
26
34
29
30
9
16
10
17
12
7
11
13
2
38
28
5
23
22
4
1
20
21
15
18
14
19
6

Fig. 4

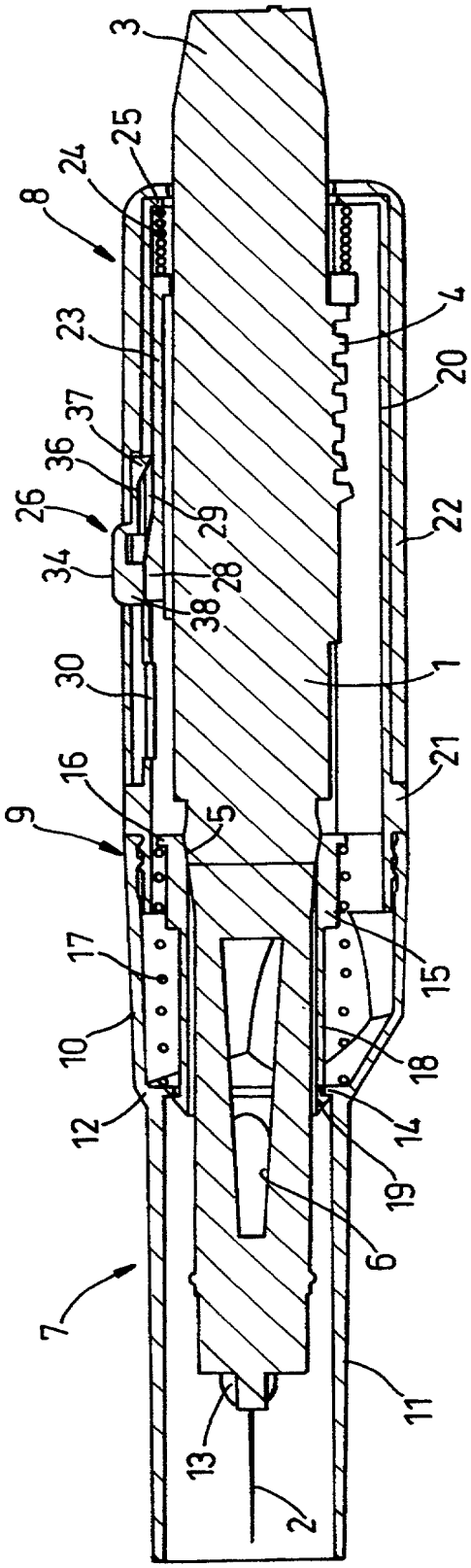
3
25
24
8
23
37
36
26
34
29
28
38
30
16
9
5
17
10
12
15
18
14
19
6
7
11
13
2
4
20
22
1
21

Fig. 5

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MEDICAL INJECTION DEVICES

the specification of which: *(check one)*

REGULAR OR DESIGN APPLICATION

[ ] is attached hereto.

[ ] was filed on as application Serial No. and was amended on (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

[X] was described and claimed in International application No. PCT/GB99/00473 filed on 15 February 1999 and as amended on (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing (day, month, year)	Priority Claimed
Great Britain	**9803084.4**	**14 February 1998**	**yes**

(Complete this part only if this is a continuing application.)

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing Date) (Status--patented, pending, abandoned)

POWER OF ATTORNEY

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from **Wynne-Jones, Laine & James** as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered patent attorneys represented by Customer No. **000466** to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, including: **Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Eric JENSEN, Reg. No. 37,855, Thomas W. PERKINS, Reg. No. 33,027, and Roland E. LONG, Jr., Reg. No. 41,949,**

c/o YOUNG & THOMPSON,
Second Floor,
745 South 23rd Street,
Arlington, Virginia 22202.

00466
PATENT TRADEMARK OFFICE

Address all telephone calls to Young & Thompson at 703/521-2297. Telefax: 703/685-0573.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: **Jeremy MARSHALL**
(given name, family name)

Inventor's signature J Marshall Date 25 August 2000

Residence: **Oxford, United Kingdom** GBX Citizenship: **British**

Post Office Address: **16 Cranham Street, Jericho,**
Oxford OX2 6DD, United Kingdom

Full name of second joint inventor, if any: **Glenn DAVISON**
(given name, family name)

Inventor's signature G Davison. Date 01 September 2000

Residence: **Oxon, United Kingdom** GBX Citizenship: **British**

Post Office Address: **"Newera", 61 Powys Grove,**
Wroxton Park, Banbury,
Oxon OX16 QUG, United Kingdom